example, in some cases, a thermal spreader **750** can contact one or more components, such as LEDs and controllers **740**. In some other cases, however, a thermal spreader **750** does not directly contact a component and an air gap can be present between the component and the thermal spreader **750**. In some cases, this air gap can be less than about a millimeter, or can be about several millimeters, or more. The thermal spreaders can include or be formed from materials having high thermal conductivity, for example materials such as carbon (e.g., in the form of graphite/graphene) or metals such as copper or aluminum. By substantially bridging a space between the body **703** and one or more components of the device **700**, a thermal spreader **750** can facilitate the transfer of heat generated by the component to the three-dimensional structure **702** of the housing **701** where it can be efficiently and effectively removed from the device, for example, by conduction as discussed herein. A thermal spreader **750** can also serve to evenly distribute heat generated in a relatively small location, for example, by a component such as an LED, over a much larger area, for example the area of the spreader itself. In addition to facilitating the removal of heat from the device **700**, the ability of the thermal spreader **750** to distribute heat can prevent the formation of hotspots in the device **700** and further allow for increased device performance. As the heat is transferred to the three-dimensional structure **702**, it can exit the device **700**, as detailed with reference to FIG. **16** below.

FIG. **16** shows a perspective view a three-dimensional structure **802** used to form a housing **801** for an electronic device **800**. The electronic device **800** can be, for example, a display or monitor, although the components of the device **800** are not depicted in FIG. **16**. The three-dimensional structure **802** can include a body **803**, such as a unitary body of aluminum. The body **803** can include a three-dimensional pattern of apertures **808** that are formed by the intersection of one or more first cavities **814** extending into the body from a first surface **804** of the body **803** and one or more second cavities extending into the body from a second surface **806** of the body **803** as discussed herein.

The three-dimensional pattern of apertures **808** can include two or more regions that are separated by one or more portions of the body that does not include the three-dimensional pattern of apertures **808**. For example, a portion of the body **810** extending substantially across an entire width of the body **803** can separate two regions of the pattern of apertures **808**. In some embodiments, the portion of the body **810** can further include structures or features for mounting or housing components of the electronic device **800**. In some embodiments, for example, one or more fans **820** can be mounted to the housing **801** at or adjacent to the portion of the body **810**.

In some embodiments where a fans **820** are positioned at or adjacent to the portion of the body **810**, the fan or fans can drive airflow into, out of, and through the housing **801** of the device **800**. An airflow pathway is illustrated in FIG. **16** by arrows **830**. In some embodiments, and as illustrated, a fan **820** can pull air into an internal volume defined by the housing **801** through the pattern of apertures **808**. Air can be pulled in from one or more of the regions of the pattern of apertures **808**. The relatively large number of apertures **808**, and in some embodiments the matrix of continuous passageways, can allow for relatively large amounts of air to be pulled into the device **800** as compared to electronic devices including traditional housings. The air can be pulled to a central location on the housing **801**, traveling past one or more components of the electronic device **800**. The components can transfer heat to the flowing air, for example by direct convection. The now heated air can then be driven out of the device **800** through the pattern of apertures **808** to facilitate the removal of excess heat from the device **800**. In some embodiments, air can be exhausted via one or multiple regions of the pattern of apertures **808**. For example, in some embodiments, the air can be exhausted primarily via a lower region of the pattern of apertures **808** as illustrated.

One airflow pattern to remove heat from the electronic device **800** is illustrated by the arrows in FIG. **16**, although other airflow patterns are expressly contemplated. Further, heat can also be removed from the device **800** via buoyancy driven airflow through the pattern of apertures **808** as discussed herein. As the airflow patterns are developed, the thermal properties of each given structure can be established, as shown, for example, in FIG. **17**.

FIG. **17** illustrates a comparative thermal map showing thermal flow in a three-dimensional structure **902** including a pattern of apertures **908** and a similarly proportioned solid body **920** that does not include a pattern of apertures **908**. A back view of the three-dimensional structure **902** is illustrated. Such a three-dimensional structure **902** can, for example, be used to form a housing of an electronic device. The thermal map has been shaded such that both the three-dimensional structure **902** and the solid body **920** are used as a housing for an identical electronic device, such as a display, that includes a variety of components in an internal volume defined by the housing. These components generate thermal energy that must be effectively removed from the device by the housing in order to achieve maximum device performance. The three-dimensional structure **902** and the body **920** have been shaded such that darker areas indicate higher levels of thermal energy. Residual thermal energy can be problematic in an electronic device, such as creating problems for the electronic components and negatively affecting efficiency. Accordingly, it can be beneficial for a housing to effectively remove large amounts of thermal energy from the device while remaining relatively cool.

As can be seen from the thermal map, the three-dimensional structure **902** has both a lower average temperature and a lower maximum temperature than the body **920**. For example, the three-dimensional structure **902** can have an average temperature that is more than about 0.5%, more than about 1%, or more than about 1.5% or more lower than the average temperature of the solid body **920**. Further, the three-dimensional structure **902** can have a maximum temperature that is more than about 0.5%, more than about 1%, or more than about 1.5% or more lower than the maximum temperature of the solid body **920**.

Even though the three-dimensional structure **902** is cooler than the solid body **920**, the rear of the three-dimensional structure **902** can still have a higher rate of heat flow than the solid body **920**, for example due to the pattern of apertures **908** in the three-dimensional structure **902**, the increased surface area relative to a planar body and defined channels. In some embodiments, the rear of the three-dimensional structure **902** can have a flow of thermal energy that is more than about 5%, more than about 10%, or more than about 15% or more than the solid body. Similarly, the three-dimensional structure **902** can have a higher capacity for thermal energy transfer than the solid body **920**. That is, even though the three-dimensional structure maintains a lower housing temperature than the body **920**, the three-dimensional structure **902** can remove a larger amount of thermal energy from the device than the solid body **920**. In some embodiments, the three-dimensional structure **902** can have a heat transfer capacity that is more than about 5%,